THE ARMY EDUCATION INFORMATION SYSTEM (AREIS):
A CONCEPTUALIZATION

JoAnn H. Bowlsbey and Carol M. Rabush
Discover Foundation, Inc.

BASIC SKILLS INSTRUCTIONAL SYSTEMS TECHNICAL AREA

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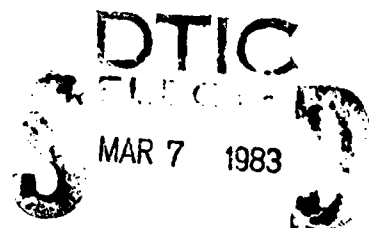U. S. Army

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This document summarizes the Army's need for a computer-based educational and vocational guidance system. A design for the Army Educational Information System (AREIS) is provided.

THE ARMY EDUCATION INFORMATION SYSTEM (AREIS): A CONCEPTUALIZATION

BRIEF

Background:

A primary objective of the Army Continuing Education System (ACES) is to provide education and career information to service members which will enhance their effectiveness as individuals, thereby maximizing the effectiveness of their Army units. The information relating to education and career opportunities for Army enlisted personnel is complex and extensive; it is also repetitive. Experience with computer-based guidance systems has shown that they are effective in accessing large data banks and in preparing users for more in-depth interviews with counselors. A computer-based education information system has been designed to capture and report accurate, up-to-date information on all ACES programs and services, and, thereby, to free Educational Counselors to engage in the activities for which they have been trained—counseling and consultation.

Assumptions and Inferences:

This computer-based education system should contain two interacting parts: a) a set of direct access functions for counselors which will perform a number of clerical tasks now handled by counselors; and, b) a series of concise, interactive, personalized instructional and guidance scripts which can be used by soldiers with little or no outside assistance.

The system should be practical, cost-efficient, and compatible with existing hardware. It should be delivered via a cathode ray tube terminal with printer.

The system will not replace counselors; instead it will perform clerical and information gathering/dispensing tasks which will complement the humanistic functions of the counselor.

Descriptions

AREIS is composed of four parts. It is designed to allow a user to move easily from any one soldier subsystem to either of the other two. Subsystem I, Orientation, provides an overview of 1) the content and capabilities of AREIS itself, 2) all ACES programs, and 3) the services of the Education Center. All first-time users of AREIS enter the system through Oreintation. Subsystem II, Self-Information assists users to identify or clarify work-related interests, aptitudes/skills, and values. Users may take an assessment device on line (at the terminal) or they may have interpreted scores of tests, such as ASVAB, taken off line. The information gained in this subsystem assists the user with goal formulation. Subsystem III, Goals and Planning, provides users with short-range and long-range goals for time in the Army or after leaving the service. AREIS asks the user to select a goal; it then provides information about all ACES programs which will help the user reach that goal. Computer storage of Form 669 will help personalize the information supplied by this subsystem. Subsystem IV, the Counselor-Administrator Subsystem, is central to AREIS. It overlaps with

parts I, II, and III and provides the data files which are accessed by both the soldier and the counselor. Other parts of this subsystem cannot be accessed by soldiers; they deal directly with counselor-administrator functions, such as modification of Form 669 or course registration, and are helpful for planning and reporting purposes.

The contractors have become aware of the overlap between the goals of the AREIS system and the Enlisted Career Information and Planning System (ECIPS), which is planned for future development. It is considered entirely feasible that these two systems can be fused into one integrated system, some component to be developed in the near future and others to be developed at a later date.

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Preface

A primary objective of the Army Continuing Education System (ACES) is to provide educational and career information to service members which will enhance their effectiveness as individuals and thereby maximize the effectiveness of their Army units. In this way, the ACES program plays an important role in the fulfillment of the Army goal of producing a combat-ready force through the development of the personal skills and military proficiency of each service member.

The information relating to education and career opportunities for Army enlisted personnel is complex and extensive; in addition, it is often repetitive. The task of gathering, dispensing, and interpreting this vital information has been the primary responsibility of the education counselor. Within recent years the total number of education counselors has been reduced from 600 to 500. Freeing counselors of the repetitious aspects of the total counseling process will allow them to engage in the activities for which they have been trained, that of counseling and consultation. Therefore, the development of an adjunct means of capturing and reporting accurate, up-to-date educational and career information to enlisted personnel has become a priority.

Experience with computer-based information systems has proven their effectiveness in providing access to large data banks and in preparing users to interact effectively with counselors. Evidence also indicates that such systems have been well received by both users and counselors; that they increase the vocational maturity of users; and that some functions, such as information gathering and dispensing, can be carried out more effectively by computers than by counselors, and at a much lower per-hour cost.

Hence, the DISCOVER Foundation, with more than a decade of experience in the development of computer-based guidance systems, has been charged to design a prototypal computer-based interactive system of information on military and civilian education programs which relate to the Army enlisted career progression system. The purpose of this document is to present the conceptualization of the total Army Educational Information System (AREIS).

Part I. **Assumptions and Inferences in Regard to the Army Education Information System**

In the writing of this preliminary conceptualization of this computer-based system, the contractors are operating upon and suggest the following assumptions:

1. The system to be developed for Army Education Centers should have two distinct, though interacting, parts:

   a) a set of direct access functions for ESO's and Education Counselors, and

   b) a system of interactive instructional and guidance modules for enlisted personnel, designed to reduce the information-giving tasks of counselors.

2. The system which is proposed at this time should be practical in the sense that it is cost-efficient, compatible with current hardware and software capabilities, and implementable within a one to two-year period. In other words, this conceptualization will not attempt to propose an idealistic, future state-of-the-art system.

3. Counselor functions proposed for the system should have the following characteristics:

   a) They should not create additional counselor clerical work; rather they should help minimize counselor clerical work.

   b) They should be streamlined and direct; for example, they should not require the use of lengthy on-line dialogue, but should provide direct and easy access to files with a minimum of "computer language."

   c) They should include at least the following capabilities:

      1) On-line building or modification of Form 669

      2) Display of Form 669

      3) Display of schedule of courses available on and near post

      4) On-line registration for courses, if feasible

5) Tallying of data from Form 669 as needed for planning and reporting

6) An easy author capability to modify existing text or create new text

4. Programs for soldier use should have the following characteristics:

a) They should be highly interactive, requiring a high level of user involvement.

b) They should be personalized to the highest extent possible by use of a stored soldier record and a multiple branching capability which permits the user to interact with only those parts of the system which have personal relevance.

c) Text should be written at reading levels appropriate to the target population for which the particular module or sub-module is written.

d) They should be usable with a minimum of assistance from either humans or supporting paper publications.

e) Material should be presented in concise form, and programs should provide ample opportunity for exiting or selection of other modules.

f) Content must include at least the following topics:

1) Orientation to the services of the Education Center

2) Tuition assistance programs

3) College course offerings on or near post

4) Information about tests (such as DANTES, SAT, CLEP)

5) College degree programs (B.A., M.A., Ph.D.)

6) Associate degree programs (A.A.)

7) ACE credit for military experience

8) BSEP

      9) High school completion programs (GED, diploma)

     10) Vocational-technical courses

     11) Language programs

5. The system is in no way designed to replace the functions of the Education Counselor; rather it is designed to assist with routine information-giving in light of the heavy counselor:soldier ratio.

6. Delivery mode will be a cathode ray terminal with attached printer.

7. System use will be monitored by the program so that past uses can be reviewed and new ones initiated from the last sign-off point.

8. Data bases will be avilable through a computer, the type and location to be determined.

Part II. <u>Preliminary Description of the Army Education Information System</u> (AREIS)

A. Overall Design and Schematic

The first assumption listed in Part I of this paper states that the Army Education Information System should have two distinct, though interacting, parts--direct access functions for counselors and ESO's and interactive informational dialogue for enlisted personnel. The informational needs of these two target populations are clearly different. The counselor needs quick and direct access to files; the soldier needs instruction about those files, as well as ready access to them. Further, the counselor needs access to some functions and files which the soldier does not need.

The design which is presented here, therefore, is an attempt to meet four criteria: 1) to provide a common set of data bases for use by both counselor and soldier which can be accessed in different ways to meet the needs of both; 2) to provide for soldiers an "automated library" of extensive information about the topics specifically identified by counselors and ESO's in the needs assessment as high priority; 3) to provide this information in as interesting and relevant a format as possible in order to avoid using the computer simply to display frame after frame of informational text; and 4) to personalize the information provided by making use of a stored soldier record and system monitoring.

The proposed system, presented in Figure 1, is made up of four subsystems. The central system, Subsystem 4, is the COUNSELOR-ADMINISTRATOR SUBSYSTEM. Those parts which overlap with the three soldier subsystems (depicted as shaded areas) represent files (such as descriptions of ACES programs, interest inventory scores, descriptions of civilian occupations, or descriptions of Military Occupational Specialties) which the soldier may access through instructional dialogue and the counselor may access directly. The non-shaded part of Subsystem 4 represents

those counselor-administrator functions which soldiers cannot use (such as modification of Form 669 or registration for courses).

Subsystems 1, 2, and 3 are modules of interactive dialogue for soldier use, with files of information which can be accessed directly by the counselor. Subsystem 1, tentatively called ORIENTATION, would be required for all users the first time on the system. This subsystem will review the Army Education Information System and its capabilities for the user, provide an overview of ACES programs, and give an overview of the services of the Army Education Center.
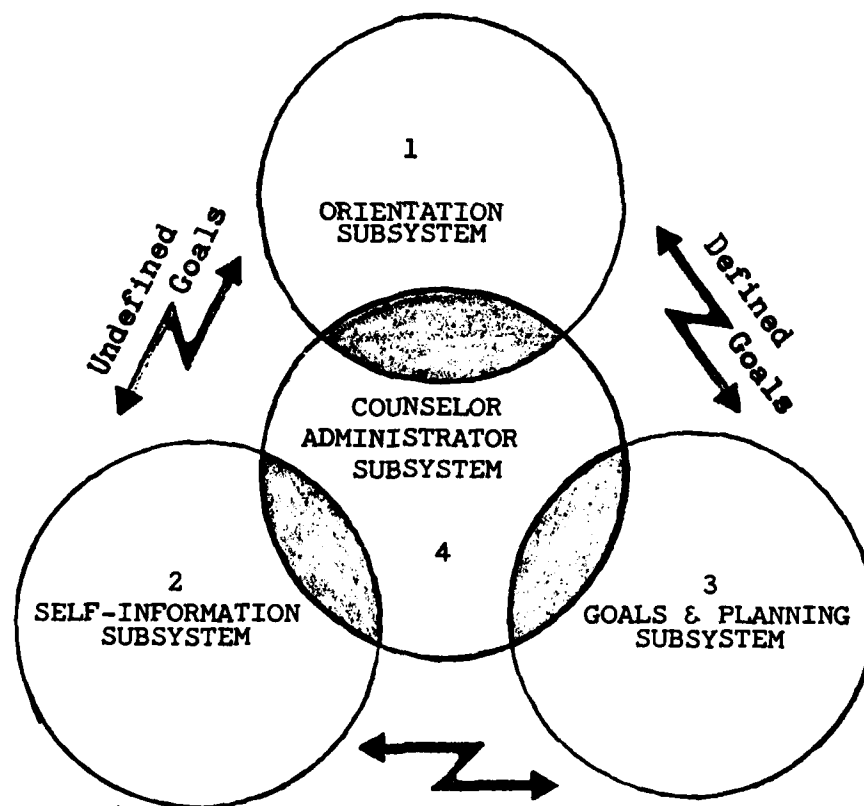

Figure 1

Subsystem 2, tentatively called SELF-INFORMATION, is an optional inter-
mediary system placed conceptually between ORIENTATION and GOALS AND PLANNING
for those who need assistance in formulating short-range or long-range goals
for time in the military or after leaving military service. The SELF-INFORMATION
subsystem will address at least three areas: 1) work-related interests as
assessed by the on-line administration of an interest inventory; 2) work-
related aptitudes and/or skills as assessed by ASVAB, MOS proficiency, course
work recorded in Form 669, and/or on-line assessment; and 3) work-related
values as assessed by a values exercise. After completion of all three of the
modules in subsystem 2, the system will provide a concise summary for the user.

Subsystem 3, tentatively called GOALS AND PLANNING, will provide soldiers
with a detailed list of goals, both short-range and long-range, which the
Army might assist them to reach. Examples of short-range goals are: completing
high school, getting job skills for future use, and getting promoted. Examples
of long-range goals are: completing college, making a transition to a civilian
job, or making a vocational choice. The user will be asked to specify a goal
(or goals), and the system will provide information about all of the ACES pro-
grams which could contribute toward the meeting of that particular goal. Such
information will be personalized by the use of information from the computer-
stored 669. For example, selecting a goal of "completing an educational degree,"
then selecting "Associate of Arts Degree," could produce the response, "You have
completed nine hours toward this degree. Your educational counselor can help
you learn which courses will be available this coming semester."

The system will be designed in such a way that the user may make easy
transitions from any one of the soldier subsystems to either of the other two.
The user will always "sign-on" in subsystem 1 so that a review of past uses
and future possibilities can be made. The soldier may use parts of subsystem 3
at times when definite goals can be identified. The user may choose to go to the

material in subsystem 2 at any time it may be needed to assist with the formulation of other short-range or long-range goals. Likewise, the user may return to subsystem 3 many times as new goals become relevant.

B. More Detailed Description of Subsystem 1: ORIENTATION

The purposes of ORIENTATION are: 1) to provide instruction about the content of the total system; 2) to assist the soldier to know which parts of the system would be most useful; 3) to give a brief explanation and overview of all Army Continuing Education programs; and 4) to explain the services of the Education Center.

This subsystem will be the entry point for each use. When the soldier signs on with a unique number, the computer will ascertain whether this is first use of the system or not the first use. If the former, the user will be exposed to the material in ORIENTATION; if the latter, the system will use information in the stored record to provide a review of past uses and to offer alternatives for the current use. For example, the system might state, "The last time you used the system, you assessed your interests in the SELF-INFORMATION subsystem. You may continue by considering your aptitudes and values or you may go to GOALS AND PLANNING to set some personal goals and find out how your Army experiences can help you meet them." The system would also provide the capability for review of the subsystems and their modules.

The developers are aware that it is very important that the ORIENTATION subsystem be as creative and interactive as possible. If interest can be captured in the initial use of the system, the probability of return uses will be increased. At this point in development, it seems unwise to be highly specific about techniques and approaches of presenting material. The following, however, are some possible approaches:

. . . . . An on-line assessment instrument might be developed which would evaluate where the soldier is in personal vocational maturity and goal-setting. Based upon responses given, the computer would suggest an appropriate route for use of the Army Education Information System.

. . . . . The explanation of all ACES programs, which—although essential—could be deadly, might be handled in a gaming approach. In other words, multiple choice questions could be formulated about ACES programs. Getting the "correct" answers about given programs would allow the soldier to gain game points and to "skip" information about given programs. Not getting the correct answer the first time might cause the system to provide a little bit of information about the program and a chance to re-try the item. Getting a correct answer at this time would add to the score, but a lesser amount than if answered correctly the first time. Missing the item twice will "cost" the user a description of the program and will not add points to the accumulated score.

. . . . . Information about the ACES program might be handled by a menu of questions.

C. More Detailed Description of Subsystem 2: SELF-INFORMATION

Most career development theorists depict satisfying vocational choices as the end product of a careful analysis of interests, aptitudes or skills, and values. These variables predict vocational choice in the order in which they are listed here. Because of this fact and because of the suggestion of a number of Education Counselors, it is proposed that one module in Subsystem 2 be the on-line administration and interpretation of an interest inventory. Present suggestions are American College Testing Program's Vocational Interests, Experiences, and Skills Assessment (VIESA) or Holland's Self-Directed Search (SDS). Both of these instruments have been developed for adult populations as well as secondary-level populations. The results of the inventory might be interpreted in terms of both civilian occupational possibilities and military MOS.

A second module of this subsystem should address skills and aptitudes. Skills assessment could be some combination of the following: a) military-related skills as indicated by Military Occupational Specialty and level; b) on-line aptitude assessment via ACT's Career Planning Program (CPP); c) use and interpretation of ASVAB scores; and/or d) the self-rating of skills on the skills section of the previously mentioned VIESA (adult version).

A third module of subsystem 2 could address work-related values. Katz's ten work values (high income, independence, prestige, leadership, security, early entry, field of interest, variety, leisure, and helping others), as well as military-specific values, such as fitness and appearance, might be included. The system could provide a definition of three levels of each of these and ask for user selection of value and level.

The review section of subsytem 2 should synthesize interests, aptitudes/skills, and values for the user and for storage in the personal computer-stored record. This synthesis would be used as the basis for suggesting occupations in subsystem 3. This subsystem should conclude by encouraging soldiers

to talk with their counselors about the implications of the SELF-INFORMATION gained.

D. More Detailed Description of Subsystem 3: GOALS AND PLANNING

The purposes of GOALS AND PLANNING are: 1) to assist soldiers to identify personal educational and vocational short-range and long-range goals; and 2) to provide detailed and personalized information about ACES programs which are related to identified goals. As indicated earlier, the emphases in this subsystem are on utilization of Form 669 data to personalize the information provided and on providing only information which has relevance for reaching identified goals.

The following goals could be used as an organizational scheme for ACES programs in this subsystem:

Short-range: 1) to improve basic skills
               2) to develop some new interests (for self-
                  improvement or use of leisure time)
               3) to get some job skills
               4) to complete a next step in education (with sub-
                  options to complete high school, A.A., B.A., M.A.)
               5) to plan my military career
               6) tc improve MOS proficiency
               7) to select a secondary MOS
               8) to get promoted
               9) to make a good decision about re-enlistment

Long-range: 10) to make a vocational choice
              11) to complete an educational degree
              12) to make the Army a career

Selection of a goal would provide the soldier with extensive information about all ACES programs which would provide assistance in the meeting of that goal. Some goals might involve search strategies and extensive data files. For example, goal 10 (making a vocational choice) would allow the soldier to use self-information (from subsystem 2) and other variables (such as MOS and job characteristics) to identify a list of possible occupations. A data file might provide extensive

information about approximately 450 occupations. Goal 11 (complete a degree) could allow a nationwide search of a college data base with some information about each of the schools in the file. The following two examples will illustrate the kind of soldier-computer-counselor interaction which could be developed.

Example 1: Goal 4 (to complete a next step in education)

Soldier: selects goal 4

Computer: checks Form 669 and comments that soldier has completed high school and has 6 hours of college credit; asks for identification of next goal, i.e., associate degree or bachelor's degree

Soldier: selects associate degree

Computer: reviews possible associate degree programs; asks for choice of curriculum; reviews on-post and near-post opportunities for courses; provides specific information, if appropriate, about courses, schedule, etc.; explains tuition assistance program, ACE credit for military experience, availability of credits through DANTES or CLEP

Soldier: goes to Counselor for assistance in mapping out next steps

Example 2: Goal 10 (to make a vocational choice)

Soldier: selects goal 10

Computer: asks soldier to select a method for exploring, i.e., by finding occupations related to MOS, by use of self-information from subsystem 2, or by job characteristics (salary, training required, employment outlook, etc.). User can use a combination of these to develop a cumulative list.

Soldier: selects method(s) of exploration and develops a list of occupational alternatives

Computer: offers detailed information about alternatives; uses information to help soldier narrow list and to reach a tentative choice; presents road(s) of training for occupation(s)

Soldier: selects road of training and plans next steps

Computer: suggests modules on assistance with completing education during and after military service

Soldiers may enter subsystem 3 from either of the other two subsystems. Users who have well-defined goals may go directly from ORIENTATION to GOALS AND PLANNING.

Users who need self-information before formulating goals will come to subsystem 3 from 2. Soldiers will be encouraged by the system to discuss goals and methods of reaching them with their counselors.

Subsystems 1 through 3 should not be construed as a replacement for services provided by Education Counselors. The computer system should be viewed, instead, as a highly effective technological tool which will assist the soldier and counselor in the information-gathering stages which must precede decision making. Although soldiers will be able to operate the terminals alone, they will call upon the counselor to assist them in considering personally relevant information as they move forward toward a decision point.

E. More Detailed Description of Subsystem 4: COUNSELOR - ADMINISTRATOR Functions

The purposes of this subsystem are: 1) to relieve counselors of clerical work; and 2) to provide counselors with more up-to-date information for use in counseling. Anticipated functions revolve around four areas:

1) Form 669: It is recommended that this form be computerized. The form might be built by a counselor on-line or entered by a clerical person from a coded sheet. Once the data is there, it could be recalled by counselors for their work with clients and it could be searched in either on-line or batch programs for planning and report-generating purposes.

2) Storing of master schedule of all courses available on and near the post and, if feasible, an on-line capability for registering soldiers for these courses and a constantly updated tally.

3) The direct access recall of data files in subsystems 1 through 3, such as occupational descriptions, descriptions of educational institutions, and data about soldiers generated within the system (such as scores of an interest inventory).

4) An on-line author capability for the localization of material or for the development of new material.

It is apparent from field visits, as well as questionnaire data, that clerical support must be considered essential for the updating and maintenance of those parts of the system which need localization.

Thus, the computer and the counselor will perform complementary roles in the decision-making process of the soldier. This integrated process will permit the counselor to become a more professional person, allowing him/her to engage in more in-depth educational and vocational counseling. It will help the counselor to assist the soldier to relate the vast amounts of self-information, occupational data, and educational alternatives and to develop a relevant design for his/her future.

Part III. <u>Relationship Between Army Education Information System and Enlisted Career Information and Planning System (ECIPS)</u>

It is evident from all the data and observations collected during the exploration phase of this contract that the primary purpose of the ACES program is to stimulate the cognitive, affective, and general career development of the soldier; it is also evident, however, that the scope of the ACES program includes the increased military proficiency of that soldier. As the conceptualization of the Army Education Information System has progressed, it has become evident to the contractor that there is a high degree of overlap between this comprehensive system and another system called the Enlisted Career Information and Planning System (ECIPS), slated for future development. The contractor, therefore, views as entirely feasible the fusion of these two systems into one integrated system, some components of which might be developed in the near future while others might wait for later development. Such an integrated system would contribute significantly to the goal of improving the military career development element of the ACES program.

At least five of the goals proposed for inclusion in Subsystem 3 (GOALS AND PLANNING) lead directly to more detailed information about the EPMS. These goals, numbers 5 (to plan my military career), 6 (to improve MOS proficiency), 7 (to select a secondary MOS), 8 (to get promoted), and 12 (to make the Army a career), could be dealt with at a cursory level in Subsystem 3. The soldier could then be given the opportunity to go on to Subsystem 5 which would contain the detailed information about the EPMS. Making a transition from Subsystem 2 (SELF-INFORMATION) to the Subsystem 5 would also be a very logical step. The conceptualization of these two merged systems, using a modification of the previous schematic follows.
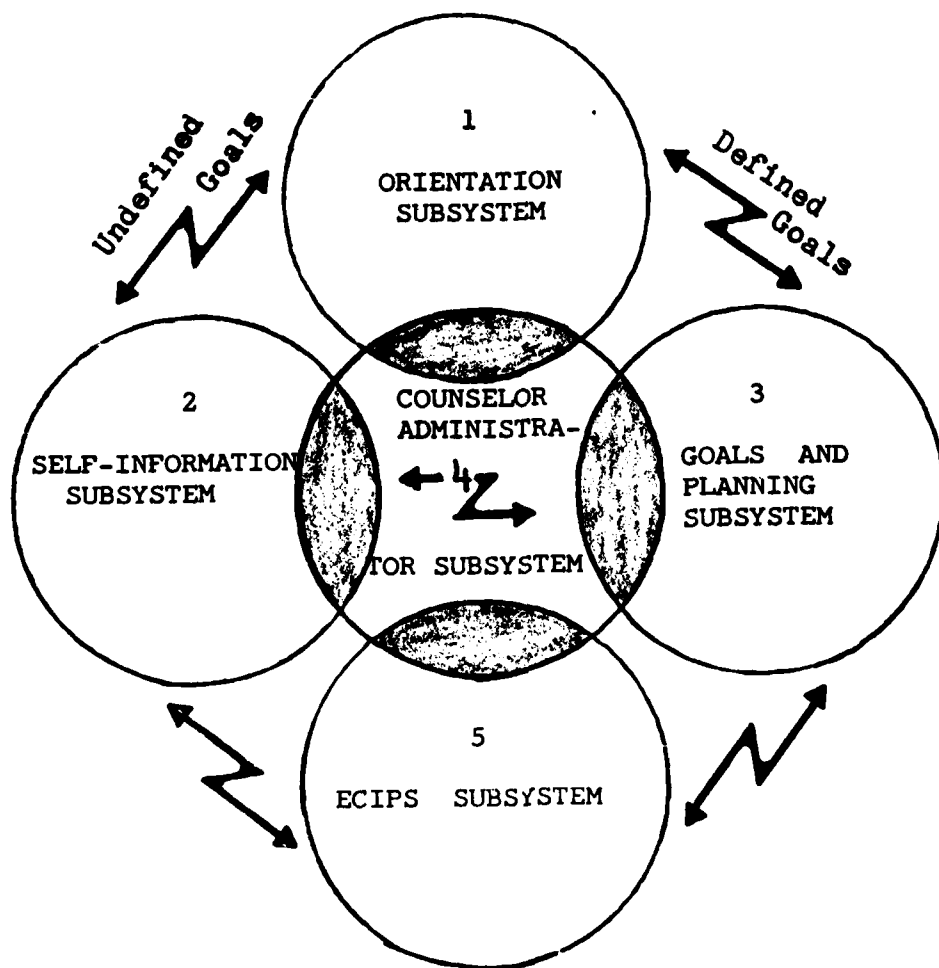
Figure 2

The contractor recommends that further attention be given to this amplified conceptualization as it would provide great efficiency in terms of resources, development time, and program integration.